

Protein Synthesis Webquest

Objective: *The purpose of this assignment is to give you a better understand of how the message found on a molecule of DNA is used to build a protein.*

Link 1 – DNA and RNA Comparison

1. Read the information presented on the website and **organize it** in the following chart.

NUCLEIC ACID	SUGAR	# OF “STRANDS”	NITROGEN BASES	SIZE COMPARISON	LOCATION IN CELL
DNA					
RNA					

2. Identify the **function** of the three types of RNA molecules.

- a. **Ribosomal RNA (rRNA)** –

- i. Describe the composition of the tiny ribosome organelle:

- b. **Messenger RNA (mRNA)** –

- c. **Transfer RNA (tRNA)** –

Link 2 – [Protein Synthesis Overview](#)

3. Define **Protein Synthesis**:
4. Summarize the importance of proteins in living organisms.
5. What are the **monomers** (also called building blocks or “subunits”) of the protein polymer?
6. *Segments of DNA which code for proteins* are known as _____.

 - a. How does this describe how to make proteins?

7. Generally speaking, list the steps which allow a cell to go from DNA → building a protein.

DNA of a specific gene “unzips”

....a protein is built and released.

8. Where in the cell does **transcription** occur (the making of RNA from DNA)?
9. RNA is read one **codon** at a time. A codon consists of _____ nitrogen bases.
10. What brings (or *transfers*) the proper amino acid to the ribosome?
11. Amino acids are joined together by _____ bonds, which explains why proteins are also sometimes known as _____ chains.
12. What ultimately determines the **function** of a protein?

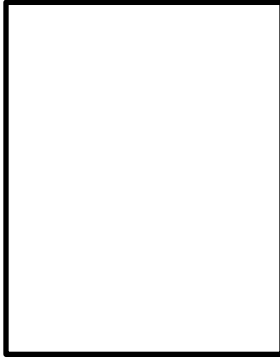
Link 3 – [Protein Synthesis Illustrations](#)

13. Read and click slides 1 – 4. Use slide 4 to draw a picture of an unzipped and exposed gene being used to create a molecule of mRNA during **transcription**. *Be sure to label both the DNA and RNA sequences, pairing the correct complementary bases.*

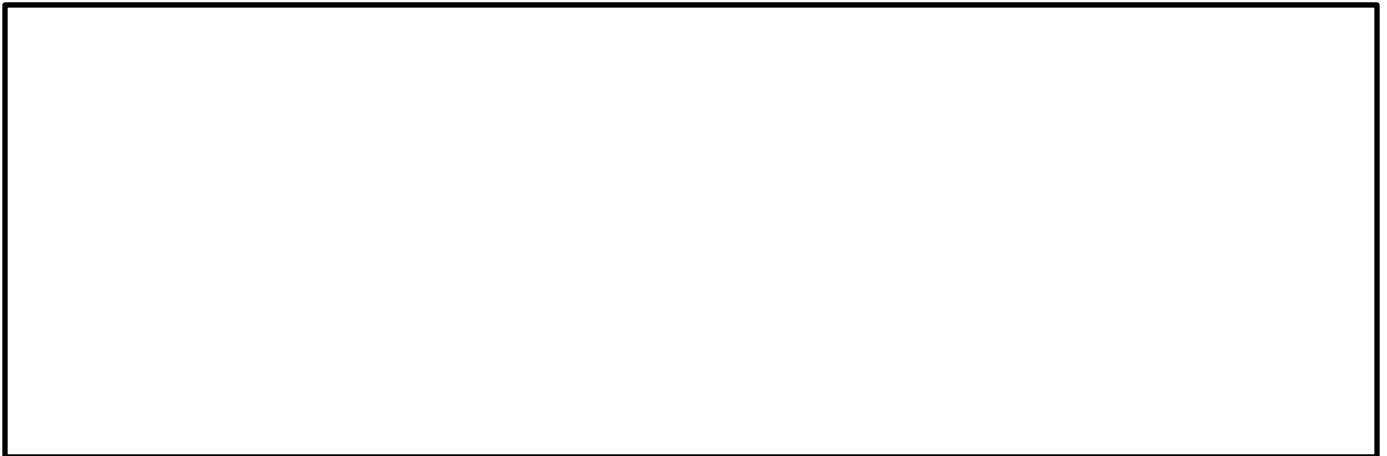


14. How does the mRNA molecule leave the nucleus?

15. Click and read slides 1 – 8. Use slides 8 and 9 to help you draw several transfer RNA (tRNA) molecules. *Be sure to label the anticodon, the binding site and the attached amino acid.*



16. Click and read slides 9 – 14. Using slide 14, illustrate how the mRNA molecule is “read” and used to build a polypeptide chain (protein) during translation. *Label the following terms: ribosome, mRNA, tRNA, codon, anticodon, amino acid, growing polypeptide chain.*



17. What happens to the mRNA molecule when protein production is complete?

Link 4 – [Transcription and Translation Practice](#)

Click on “Protein Synthesis” and unzip your molecule of DNA.

18. **Practice transcription** by building a molecule of RNA by using DNA as a “template.” Give the complementary sequence below.

DNA Sequence: T A C C C G A G G

RNA Sequence:

19. In real life, what would happen to the messenger RNA (mRNA) molecule you just created?

20. Match the complementary anticodons on the tRNA molecules. Identify the coded amino acids below.

a. mRNA codon: A U G

i. What is the complementary *tRNA anticodon*?

ii. This codon signals for which amino acid?

b. mRNA codon: G G C

i. What is the complementary *tRNA anticodon*?

ii. This codon signals for which amino acid?

c. mRNA codon: U C C

i. What is the complementary *tRNA anticodon*?

ii. This codon signals for which amino acid?

21. How do you know when the protein being built is **complete**?

Link 5 - [Final Analysis](#)

22. Use the diagram in the bottom right corner. In summary, **what IS transcription**?

23. Use the diagram in the bottom right corner. In summary, **what IS translation**?

24. Use the diagram in the bottom right corner. Draw the diagram which illustrates the entire process (DNA → RNA → Protein). *Label all major parts!!*

25. Build the protein using the given DNA sequence and the chart seen on the right of the webpage. What is the final amino acid sequence?

_____ → _____ → _____ → _____ → _____ → _____